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Corporate Responsibility as a Strategic Goal: Open Source Healthcare Appliances in Developing Countries

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Corporate Responsibility as a Strategic Goal: Open Source Healthcare Appliances in Developing Countries

by

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Dedication

I dedicate anything positive from this thesis to my Lord and Savior, Jesus Christ.

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I first give thanks to God who gives me life, and the ability to seek higher education. Thanks to the Blessed Virgin Mary for her powerful intercessory prayers. Thanks to my wife, Elissa, for her support, and my parents, Manuel and Sandra, for their encouragement. Thanks to my Thesis committee, Dr. Duvic and Dr. Ambler, for their guidance over the last two years. Thanks to my friend Judy for her review, and the company IBM for their financial support of my education.

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Abstract

Corporate Responsibility as a Strategic Goal: Open Source Healthcare Appliances in Developing Countries

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The University of Texas at Austin, 2010

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Despite the trillions of dollars spent over the past decades on foreign aid 80% of humanity still lives on less than $10 dollars a day. There is an alarming need to deliver quality healthcare services and products to developing countries. The healthcare industry for developing countries is estimated to be $202 million and growing exponentially. However, intrinsic obstacles have prevented companies from fully deploying solutions in these countries. With the emergence of Citizen-Sector Organizations companies now have an alley to create High Value Chains enabling companies to deliver solutions to developing countries. Thereby, increasing shareholder value and increasing the living conditions of global citizens. As citizens of developing countries have better health care they are better equipped to succeed economically and consume other services and products the company has to offer. This paper discusses how an engineering manager can increase shareholder value by aligning corporate responsibility with the company's strategic goals by leveraging High Value Chains. Specifically this paper discusses how open source methodologies can be utilized to improve healthcare in developing countries while increasing shareholder value.

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Introduction

Today's company is perpetually operating in a global context from utilizing worldwide supply chains and resources to employing a global workforce. Consequently, the actions of an engineering manager have a wider scope and impact. As a result, an engineering manager becomes a global citizen, and must be conscious of his/her decisions upon the global community. Entering into the global community means realizing 80% of humanity lives on less than $10 a day (Shah 2010).

There is a real and present need to provide products and services to the impoverished. An innovative company looking to establish themselves as a respectable global market leader recognizes this need as an opportunity to increase shareholder value. In the past a company has relegated such duties to philanthropy; however a successful company realizes the immense opportunity to meet the critical needs of an untapped prodigious market.

Until recently the engineering manager had to make a choice between investing in philanthropy and profit making endeavors. Increasing shareholder value and delivering solutions to the world's poorest are not opposed to each other. In fact, meeting the needs of the world's poorest to increase shareholder value can efficiently deliver high quality services and products in a sustainable manner.

It is the duty and responsibility of an engineering manager to perceive the future market, and create innovations to meet those needs. In today's global market is no longer acceptable to ignore the needs of the poor, and maintain continued profitability. "Once

profit becomes the exclusive goal, if it is produced by improper means and without the common good as its ultimate end, it risks destroying wealth and creating poverty (Benedict XVI 2009)." Thus, as we become a more globally connected society it becomes a necessity to innovate and collaborate with the public sector for the well being of not only the company but humanity as well.

Opportunities in Developing Countries

The United States Gross Domestic Product (real growth rate) has been below 4.40% since 2003, and has been steadily decreasing since 2005 (Index Mundi 2010). Moreover, the US GDP (real growth rate) for 2010 is projected to be -2.40% (Index Mundi 2010). In contrast, developing countries such as Afghanistan, Zambia, Mozambique, and Nigeria all have Gross Domestic Product (real growth rate) above 6% (Central Intelligence Agency 2010). Consequently, there is a real economic opportunity for engineering managers to seek opportunities in developing countries.

- Serving low-income citizens of developing countries opens an enormous market virtually untouched. The Harvard Business Review collected the following market estimations for developing countries (Drayton and1ion for health care.
- $424 billion for low-cost housing.
- $553 billion for energy.
- $3.6 trillion for agricultural products and food.

Additionally, the World Resources Institute and International Finance Corporation reported low-income consumers accounted for $6 trillion dollars in 2005 and is growing at 5% annually (Drayton and Budinich 2010). Such figures should entice any engineering manager's interest. Furthermore, an engineering manager should realize these markets will be the growth markets needed to sustain a company's continued profitability. As an example, take the housing market. Nearly one-sixth of people in the world, 1 billion people, live in squalid conditions (Drayton and Budinich 2010). An engineering manager in any area related to housing needs to be thinking of how she/he can break into this market and deliver solutions for this lucrative market. The health care

industry for the low-income worldwide is estimated to be $202 billion and is expected to grow exponentially (Drayton and Budinich 2010). An engineering manager must be conscious of trends and anticipate changes in the market. An engineering manager who is not aligning her/his company's goals to participate in these markets may consign their company to failure.

When companies are pressed to continue generating shareholder value in a downward economy, engineering managers must seek growth economies in order to be able to not only weather a local struggling economy, but continue to meet and exceed shareholder expectations. Therefore, we see United States and European based companies becoming much more aware of opportunities in China, Brazil, and India. These high growth markets present a much-needed solution to an engineering manager's dilemma of continuing company profits among a floundering economy. See Figure 1 for a comparison of 10 developing countries and the United States.

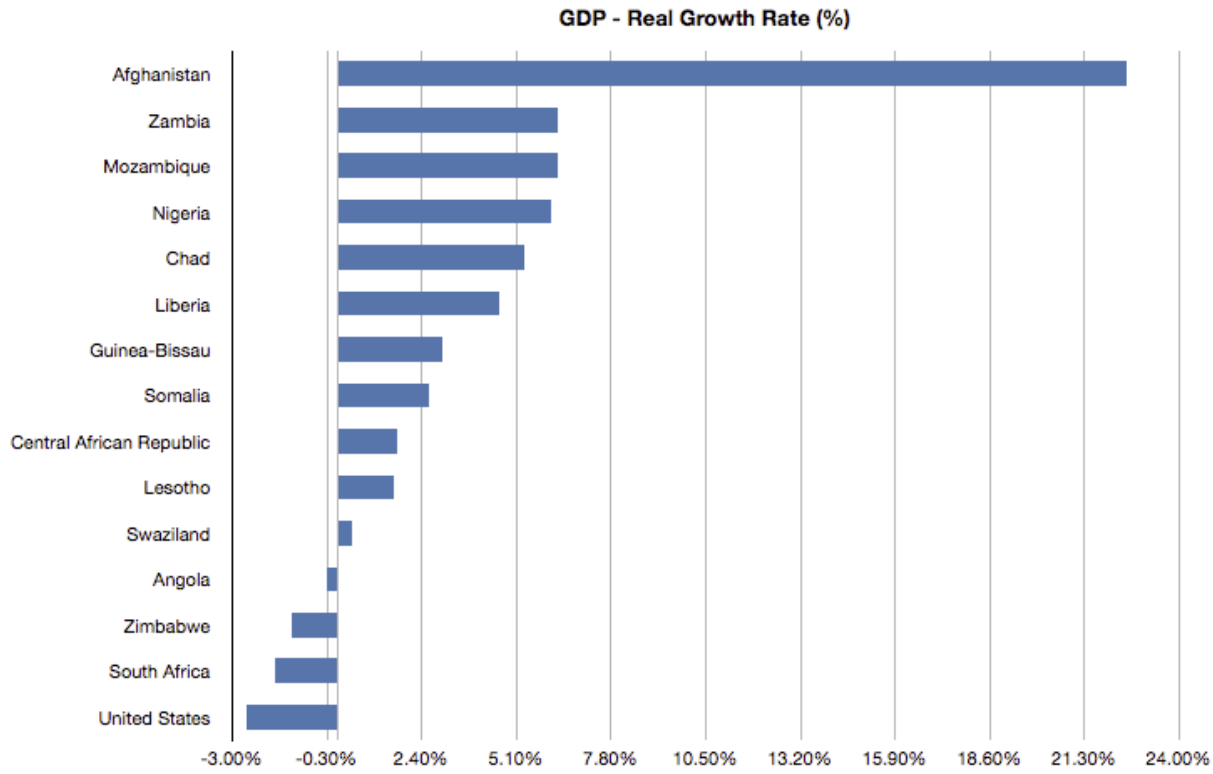

Figure 1: (Central Intelligence Agency 2010)

Figure 1 does an excellent job of graphically demonstrating the economic opportunity in developing countries in comparison to the United States.

Living Conditions in Developing Countries

Looking at this data why don't we see more companies flocking to countries such as Mozambique and Nigeria? The countries listed in Figure 1, excluding the United States, not only have a high GDP value, but also have the top 16 death rates in the world. See figure 2 for a graphical representation of the death rates of the developing countries compared to the United States.

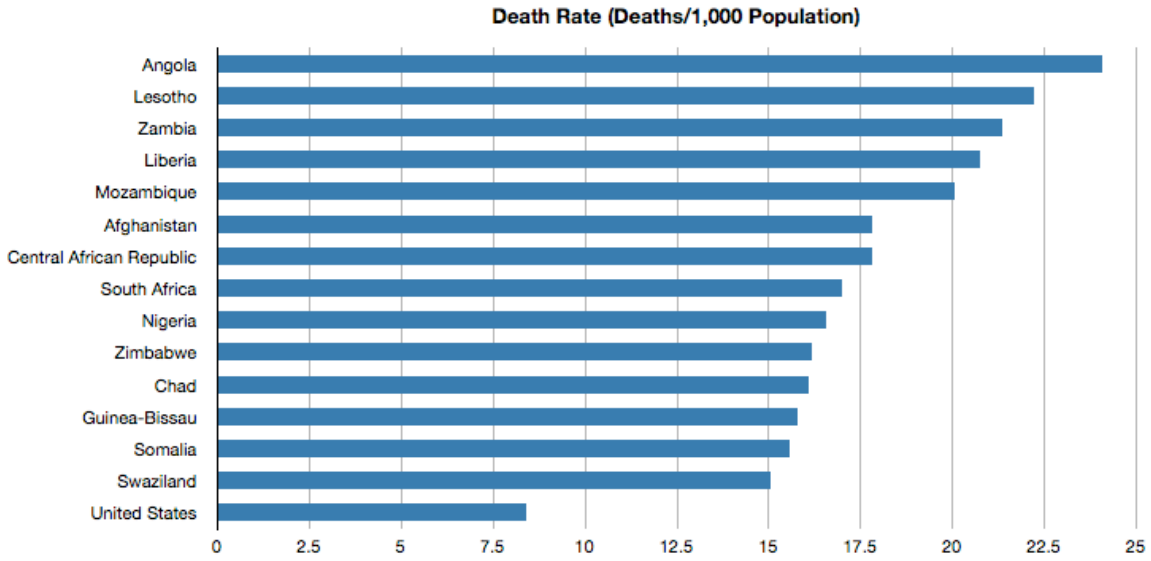

Figure 2: (Central Intelligence Agency 2010)

Despite the alluring high economic growth rates reflected by developing countries' high Growth Domestic Product, these countries have some of the lowest qualities of life for their citizens. Not only is their death rate the highest in the world, but their life expectancy at birth is among the lowest. Furthermore, most of these developing countries have half or more of their population living below the poverty line. Some countries such Zambia, Liberia, and Chad have 80% or more of their population living below the poverty line. Additionally, all of the developing countries listed obtained some of the lowest Human Development Index ratings from the Human Development Report

(Human Development Report 2010). It is apparent that these listed countries are among some of the poorest countries in the world with some of the worst living conditions. See Table 1 for the comparison of living conditions, and GDP of the 16 developing countries compared to the United States.

Country	Life Expectancy at Birth		Death Rate		Population Below Poverty Line		GDP - Real Growth Rate	
	World Rank	Years	World Rank	Deaths/ 1,000 Population	World Rank	Percentage	Wold Rank	Percentage
Angola	224	38.2	1	24.08	40	40.50%	115 (4th in 2008*)	-0.3% (13.2%)
Lesotho	222	40.38	2	22.20	27	49.00%	92	1.60%
Zambia	223	38.63	3	21.34	1	86.00%	15	6.30%
Liberia	220	41.84	4	20.73	4	80.00%	35	4.60%
Mozambique	221	41.18	5	20.07	7	70.00%	14	6.30%
Afghanistan	219	44.4	7	17.83	51	36.00%	1	22.50%
Central African Republic	218	44.47	6	17.83	NA	n/a	89	1.70%
South Africa	212	48.98	8	16.99	26	50.00%	145	-1.80%
Nigeria	216	46.94	9	16.56	8	70.00%	17	6.10%
Zimbabwe	217	45.77	10	16.19	12	68.00%	134	-1.30%
Chad	215	47.7	11	16.09	2	80.00%	22	5.30%
Guinea-Bissau	213	47.9	14	15.79	NA	NA	66	3.00%
Somalia	211	49.63	15	15.55	NA	NA	73	2.60%
Swaziland	214	47.85	16	15.03	10	69.00%	107	0.40%
United States	49	78.11	99	8.38	128	12.00%	157	-2.60%

Table 1 (Central Intelligence Agency 2010)

While foreign aid has been working to resolve many of the inadequate living conditions in developing countries, it has been largely unsuccessful. Dr. William Easterly asserts,

> "After 43 years and $568 billion (in 2003 dollars) in foreign aid to the continent, Africa remains trapped in economic stagnation. Moreover, after $568 billion, donor officials apparently still have not gotten around to furnishing those 12-cent medicines to children to prevent half of all malaria deaths (Easterly 2005)."

Dr. Easterly continues on to state the main inhibiting factors are lack of proper evaluations and appropriate feedback loops (Easterly, Planners vs. Searchers in Foreign Aid 2006). Dr. Easterly states foreign aid should have to undergo unbiased outside third party evaluations of projects currently in deployment. After the project completes feedback should be collected containing positive and negative points that can be passed on to future projects (Easterly, Planners vs. Searchers in Foreign Aid 2006). Furthermore, Dr. Easterly maintains foreign aid does not have any one person accountable for any one project (Easterly, Planners vs. Searchers in Foreign Aid 2006). Thus, there are no proper incentives to fail or to succeed. Dr. Easterly outlines the main deficiencies of foreign aid and largely points to how companies having these checks and balances built into the system are better equipped to resolve the needs of developing countries (Easterly, Planners vs. Searchers in Foreign Aid 2006).

The market demands companies deliver high products and services as efficiently as possible. The market rewards those who do, and penalizes those who don't. This is the core of economics, which Adam Smith first coined as the invisible hand (Smith 1790). Companies are driven to succeed by means of competition for a finite number of customers to supply their products on a customer demand basis in order to ultimately improve shareholder value.

A company has a continuous feedback loop through its customers. A company is constantly under evaluation by the customers it serves and the shareholders who invest in the company. Companies not only welcome this feedback, but also actively seek this feedback in order to improve their product offering and gain a competitive advantage. It is in the company's best interest to learn of the customer's needs and develop innovative solutions to meet those needs in the most efficient means possible.

The company is ultimately responsible for its actions, and with an organizational structure an individual or limited sets of individuals are responsible for the company's direction. This accountability drives managers to deliver high quality products that specifically meet the customers' needs as efficiently as possible or they risk loosing their job and reputation.

When a company delivers an exceedingly innovative product that meets the needs of customers in the market place the company is directly and immediately rewarded by the market through the means of increased profits. The converse is also true. When a company fails to adequately meet the needs of customers it is penalized by the market by a decrease in sales. If such a trend continues a company is destined to failure. The market has built in mechanisms to advance companies able to meet customers' needs as efficiently as possible, and eliminates companies who are unable to do so.

Companies operating in a free market have the foundation of an invisible hand at their core, which produces a sustainable ability to meet customers' needs as efficiently as possible. Feedback, incentives, accountability, and competition are all cornerstones for a healthy market. These attributes drive innovation, and allow for customers' needs to be meet in the most efficient way possible. The critical needs of developing countries coupled with the tremendous market opportunity and the innate ability for companies to meet customers' needs presents a sustainable solution to one of the most urgent needs of humanity today.

Economic Inhibitors in Developing Countries

Figure 1 demonstrates there is a real economic opportunity in developing countries. However, the living conditions and poverty the people in these countries face also present obstacles to companies wanting to do business in these countries. Poverty is the chasm between companies and service to the people of developing countries. Figure 3 displays the needs of developing countries that can be filled by those companies needing new economic opportunities.

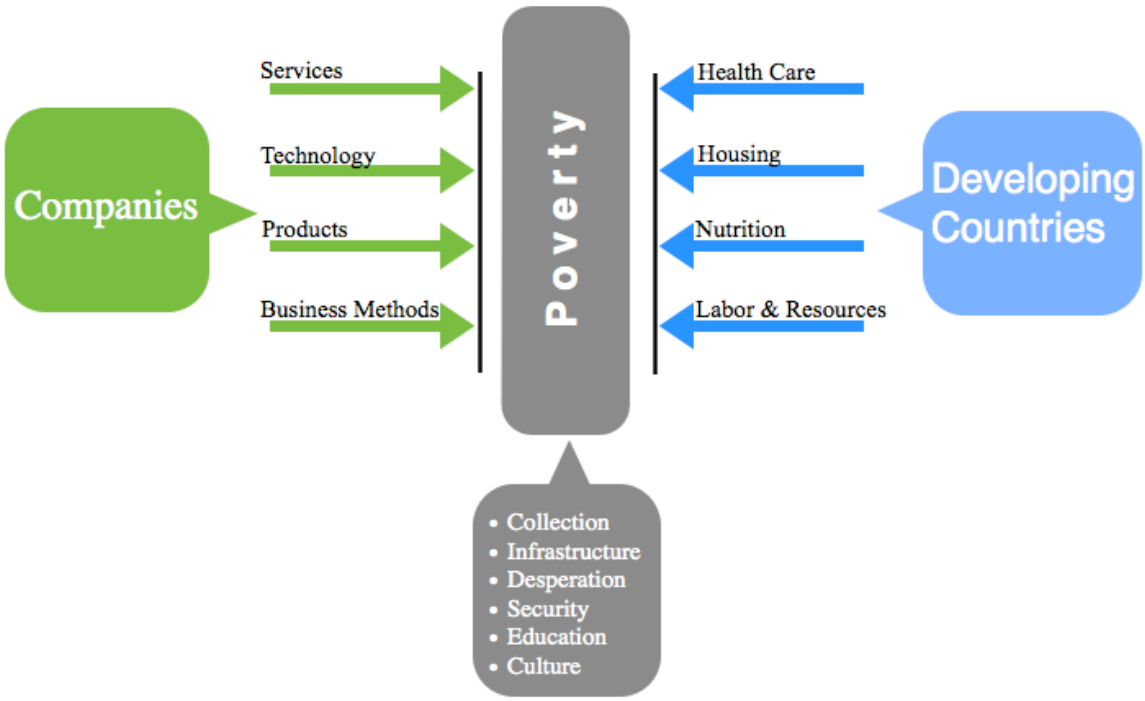

Figure 3: Opportunity-Poverty Gap

The Opportunity-Poverty Gap shown in Figure 3 depicts how inherent factors of an impoverished country block the filling of critical needs by companies.

Most consumers in developing countries have a low income, and saving for services, especially after consumption, becomes burdensome (Beshouri 2006). Furthermore, it becomes more costly for companies to try and locate overdue accounts,

and company employees may be faced with dangerous situation. As collections become more difficult, the standard the company sets for new customers becomes higher thereby increasing the difficulty to find them.

Infrastructure issues such as electricity, plumbing, mail, roads, and city planning all present complex situations for a company looking to deliver services and products (Beshouri 2006). Most new technological innovations have the need for electricity. Thus, before companies are able to introduce such products they must establish the capability of delivering electricity to the customer. In the utility industry, many homes in developing countries are not wired or plumbed for services. Thus, the consumer must make a substantial investment upfront in order to begin receiving services. Furthermore, delivering products on low quality or no roads presents another obstacle in a company's distribution process.

Unfortunately, in many developing countries the factor of desperation comes into play with products and services. People trying to literally survive will make more bold moves to attain essential products. However, such acts cannot only deter a company but can also destroy the integrity of the product for the community. For example, in 1997 people in Manila felt it was necessary to make illegal connections to a water line in order to obtain water. However, doing so resulted in costly repairs to retain integrity to the community's water supply (Beshouri 2006).

People who live in low-income situations with high unemployment over long periods of time in concentrated areas without any perceived government assistance often join radical political groups seeking to do harm to a company's assets (Beshouri 2006). Delivering products across such a country can lead to theft of products, harm to company employees, and enforcement of taxes by revolutionary groups.

In developing areas there is sometimes the connotation of an outside company not being integrated into the community and thus not having the community's best interest at heart. Furthermore, the country's education level becomes a factor on how services are delivered. If consumers are unable to read and understand the services offered, they are mostly likely not going to purchase the service. Moreover, if the consumers cannot read their bill they may not know how to pay for services rendered.

The inherent obstacles of operating in a developing country may seem insurmountable to a company evaluating the prospect of doing business in a developing country. There are real risks associated with delivering services to the world's poorest in developing countries. Thus, the need remains largely unfilled, and the opportunity remains for an innovative engineering manager to fill a vital need while remarkably improving shareholder value, and improving the lives of fellow humans.

Bridging the Opportunity-Poverty Gap

Until recently companies venturing to commence in profit making endeavors in developing countries were very rare. The operating difficulties in a developing country may have made other investment opportunities seem more appealing. Despite the monumental opportunity, solving the predicament of delivering services to the poor in developing countries proved too grand of an undertaking for an engineering manager to tackle. However, with the emergence of the public sector companies have a new alley in tapping into an immense market, and engineering managers are taking a new look at this historic opportunity to help eliminate poverty while adding significant shareholder value.

In the United States the public sector grew 300% since 1982 (Drayton and Budinich 2010). Other countries are also seeing dramatic growth in the public sector. Brazil's public sector grew from 36,000 to a million over the past 20 years. (Drayton and Budinich 2010). In addition, the public sector is attracting creative new talent. "In 2003, 1 per cent of MBAs at the Yale School of Management went into non-profits or the public sector; last year, 9 per cent did (Knight 2010)." Recent graduates are not primarily concerned with salary, but are more socially conscious. Mr. Lundry a recent graduate of NYU's Stern School said, "I like knowing that what I do has a positive impact on the world (Knight 2010)." Non-profits such as Bridgespan are getting a large applicant pool for positions. In 2010 Bridgespan received 2,000 applications for 20 positions, which is on par with its for-profit counter part, Bain (Knight 2010). The public sector is attracting talented new agents who are producing innovative solutions to rival for-profit companies.

The public sector is providing services and products to meet customer needs in the same way for-profits do, but in a socially conscious way. The public sector's success is allowing non-profits to expand, and raise funds necessary to be able to invest into the organization's projects. For example David Green the co-founder of Aurolab, a company

based in India, was innovative enough to drop the cost of intraocular lenses used to help patients with cataracts to regain their eyesight from $300 to $10 or less. “It [Aurolab] has captured about 8% of the global intraocular lens market and sells about 1.5 million such lenses each year in 109 countries (Drayton and Budinich 2010).”

Corporations have the ability to raise funds, finance projects, and capabilities to deliver products to markets. These abilities are not easily acquired, and are an inescapable need of the public sector. On the other hand, the public sector has tacit knowledge concerning the local community, and has gained the trust of the local community through its strong social networks. The solution to obstacles inhibiting companies from successfully operating in developing countries lies in collaborating with the community in uniquely creative ways. The public sector has expertise in this area, and has developed resourceful methods to overcome many of the prior obstacles companies faced when deploying solutions in developing countries. The article, “A New Alliance for Global Change” introduced the term Hybrid Value Chins (HVCs) to describe the strategic partnership of business and the public sector to deliver products and solutions to the low-income customers while increasing the company’s shareholder value. This is the bridge companies and low-income individuals have been waiting for. This partnership works in synergy to provide the much-needed services to the world’s poorest while delivering substantial shareholder value to the company. Figure 4 elaborates on Figure 3’s Opportunity-Poverty Gap to include Hybrid Value Chains.

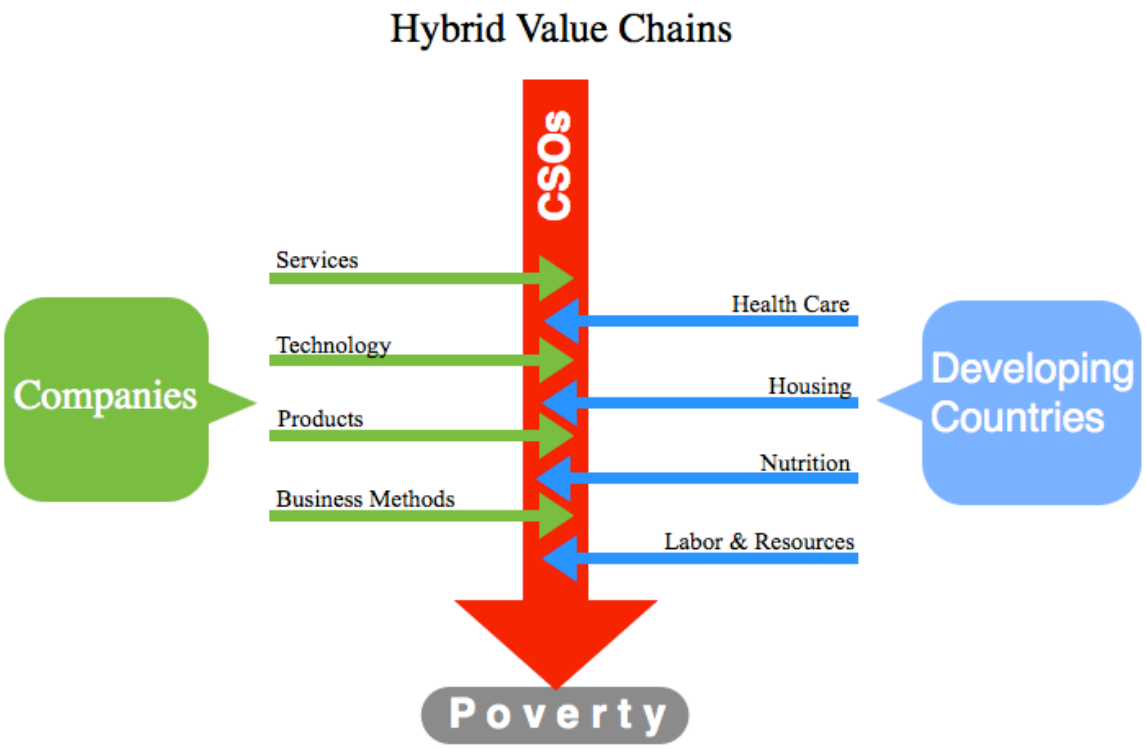

Figure 4: Hybrid Value Chain Bridge

The engineering manager now has the ability to overcome the obstacles of operating in a developing country. The innovative engineering manager now has the ability to tap into an enormous virtually un-served market. For example, Colceramica, a Columbian based company specializing in home building materials, launched a program called Viste Tu Casa (Dress Your Home) aimed specifically at addressing the needs of the housing market for the low-income. In 2009 sales reached $12 million, and with the help of 5 citizen-sector organizations (CSOs), it expanded to five of the six largest cities in Columbia. It was with the initial help of CSO Kairos, a human-rights organization, that Colceramica was able to utilize an unemployed women sales force to reduce costs, and bring the product to the end user. Kairos provided the key community network to be able to recruit, train, and manage the sales force. As a result, 28,000 families improved their living conditions, 179 previously unemployed women now earn $230/month, and

Colceramica was able to expand into a new market thereby increasing its profits (Drayton and Budinich 2010).

Companies gain a competitive advantage by leveraging the knowledge, experience, and talent created as a result of Hybrid Value Chains. This competitive advantage allows companies to innovate in order to bring solutions to the developing countries where it once was impossible. Furthermore, the investment in partnering with the public sector creates invaluable relationships, and access to decisive resources. Partnering with trusted public sector organizations allows for the local community to gain trust in the products being offered, and improves the reputation of the company in the community. All these factors enable the company to successfully be first to market. The public sector gains access to financing, resources, and corporation's ability to deliver a product to market. The end consumers finally get the opportunity to increase their quality of life while simulating the local economy. Furthermore, more jobs are produced, and the country's infrastructure is improved making it easier for other companies to provide services and products. See Figure 5 for Ashoka's graphical representation of the Hybrid Value Chain.

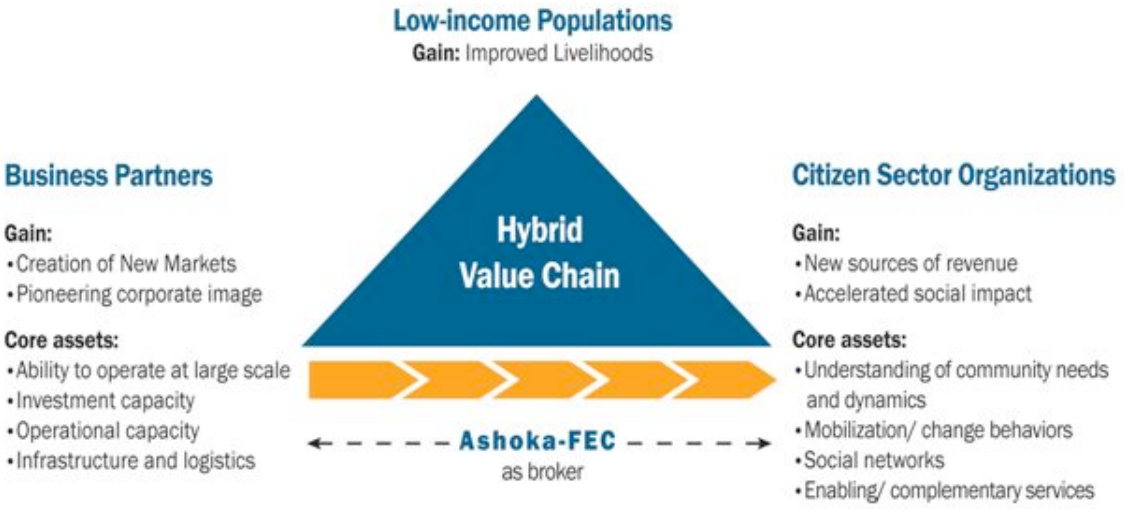

Figure 5: Ashoka's Hybrid Value Chain (Ashoka 2010)

Leveraging Hybrid Value Chains

With the emergence of the public sector, and the opportunity for companies to participate in high growth markets, properly utilizing Hybrid Value Chains becomes essential to the success of a project. "If you're not thinking about HVC collaboration, you'll soon be guilty of strategy malpractice (Drayton and Budinich 2010)." Although collaborating with the public sector is key for corporations to succeed in developing countries, it is by no means a magic wand. A company must carefully evaluate its core business functions and how these functions can be applied to the needs of the developing world. Once this has been defined, the company can start seeking the appropriate citizen-sector organization that also aligns with the company's goals. After the partnership between the company and the citizen-sector has been forged the two entities can utilize each other's strengths to deliver solutions to the target market. This is where strategic corporate responsibility departs from traditional ideas of philanthropy. The key is to align corporate responsibility with the company's unique strategy. Benefits to the company increase as the integration between corporate responsibility and strategy become more seamless.

Traditional philanthropy may have invested in areas that had no relation to the company's strategy. Philanthropy may generate good will and positive publicity. However, when not properly aligned with the company's strategy it may not help increase shareholder value. When philanthropy is not directly tied to the company's strategy it can become challenging for an engineering manager to continue investing in such philanthropy instead of investing in other profit generating activities. Furthermore, a weaker economy puts more strain on engineering managers to be more efficient with their expenditures, and philanthropy not aligned with the company's strategy becomes increasingly difficult to manage and simultaneously increase shareholder value. An

engineering manager trapped in traditional philanthropy thinking has to make a choice between investing in philanthropy or in profit generating projects.

The core of Hybrid Value Chains allows an engineering manager to continue to invest in philanthropic activities, and in parallel generate profits for the company. An engineering manager must not separate the company's strategy from philanthropy. Addressing critical social needs and generating profits for the company should not be opposed, but should be an incentive for companies to innovate in order to deliver solutions to developing countries in an efficient sustainable manner.

> "True strategic giving, by contrast, address important social and economic goals simultaneously, targeting areas of competitive context where the company and society both benefit because the firm brings unique assets and expertise (Porter and Kramer 2002)."

An engineering manager can utilize corporate responsibility to increase its competitive advantage. In today's global economy with advanced supply chains, a competitive advantage is shifting away from cheap inputs to superior productivity (Porter and Kramer 2002). Local skilled labor and close collaboration with customers are increasingly becoming important means of gaining a competitive advantage. Not surprisingly, these elements are difficult for any company to master on its own without close social ties to the community. Hybrid Value Chains offer to provide these elements at low cost to a company. Citizen-sector organizations have the trust of the local community, and are experienced in working with the local community to develop necessary skills. For example, Amanco, an agriculture irrigation company, partnered with local citizen-sector organizations to deliver needs to low-income farmers in Mexico. The local organization pooled local farmers into loan groups, educated local farmers on irrigation best practices, and worked with the community to install irrigation systems. As a result 2 million small farmers living on less than $2/day are now able to access

irrigation systems which allow them to generate higher yields. Furthermore, Amanco is enjoying operating in a market thats worth about $56 million/year (Drayton and Budinich 2010).

> "Philanthropy can often be the most cost-effective way for a company to improve its competitive context, enabling companies to leverage the efforts and infrastructure of nonprofits and other institutions (Porter and Kramer 2002)."

An engineering manager must evaluate the company's goals, and decide on the best method to engage citizen-sector organizations to properly construct a well-functioning Hybrid Value Chain. Porter and Kramer illustrate this concept well in their Convergence of Interest chart (see Figure 6).

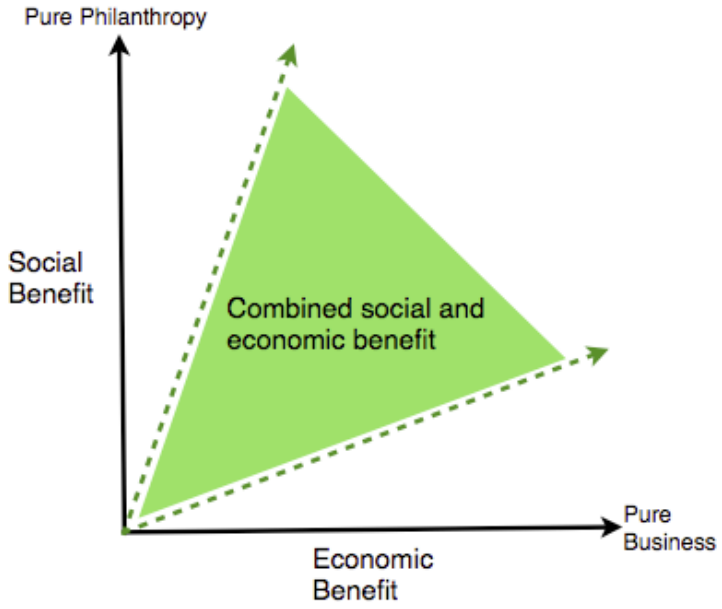

Figure 6: Convergence of Interests (Porter and Kramer 2002)

Citizen-sector organizations provide the critical bridge into the community, and corporations provide the essential resources to bring the solution into the market. It is this strong co-dependency that is forging strong partnerships, and creating an environment for both the public sector and companies to innovate and deliver sustainable solutions to developing countries.

> "Companies and citizen-sector organizations capitalize on their particular areas of expertise to deliver a valuable product or service that neither partner could provide on its own . . . This is not charity work . . . Sustainability and scalability rest on profitability (Drayton and Budinich 2010)."

Hybrid Value Chains is an inevitable resource engineering managers must become familiar with in order to participate in the high growth markets of developing countries. We see today's market leaders already exploring Hybrid Value Chains, and continuing to extend their competitive advantage while establishing their brand as a trustworthy company able to deliver essential services.

Exploring Hybrid Value Chains

"We have an opportunity—and a responsibility—to make the world work better (International Business Machines Corporation 2009)." Market leaders are on the forefront of Hybrid Value Chains, and are actively exploring how Hybrid Value Chains can be successfully integrated into their strategy. IBM is aware of this opportunity to add shareholder value while addressing some of the most pressing needs of developing countries. IBM has recently transformed its philanthropic activities to concentrate on delivering services to developing countries by partnering with local non-governmental organizations. IBM has named this new initiative the IBM Corporate Service Corps. High performing IBM employees apply to the program, and selected employees are then deployed to developing countries after undergoing months of IBM's Corporate Service Corps training. The international teams of IBM employees are assigned to work with specific non-governmental organizations based on their skills. The IBM team works locally with the non-governmental organization exclusively for a month to resolve some its most pressing needs. IBM recognizes the need to collaborate with the public sector in order to be able to deliver services to the community. The Corporate Service Corps is the first step for the company. In addition, IBM is infusing its employees with global leadership skills while delivering the highest quality of service to non-governmental organizations. Stanley S. Litow, IBM's vice president of corporate citizenship and corporate affairs, summarized the triple benefit to all three parties by stating,

> "What we as a company get is leaders with a broader range of skills that can function in a global context. What the individual participant gets is a unique set of leadership opportunities and development experiences. And what communities get are IBM's best problem solving skills. It's a triple benefit (International Business Machine 2008)."

Despite a struggling economy IBM not only continued the Corporate Service Corp program, but also expanded the program. Since IBM founded the program in July of 2008, it has deployed 700 employees to 14 countries (International Business Machines Corporation 2010). This is a testament to the value IBM sees in the program for the value it brings to the company's strategic goals and to the communities in which it operates. Recently Fortune ranked IBM as the premier company where leaders should work. The number one ranking cited the Corporate Service Corp as one of its main factors (Fortune 2009). Furtermore, IBM's employees also see the value. When the program launced in 2008, more than 5,000 qualified employees applied for 100 spots (International Business Machine 2010).

ANTONIO ROSALES' IBM CORPORATE SERVICE CORP EXPERIENCE

In November of 2008 I applied to a very competitive new IBM program which promised to deliver international leadership experience for high performing IBM employees. The new program was advertised to supply the employee with appropriate training and to utilize the employees' skills to collaborate with not for profit international organizations in order to help improve that organization's mission. This seemed like an exceptional opportunity to gain valuable skills, international experience, and simultaneously provide service to a non-profit organization at no cost. To me, this was not a matter of if I would apply, but more of would I be accepted among the large brilliant candidate pool. This seemed to be the same sentiment of other IBM employees as more than 5,000 employees applied for 100 available positions in 2008 resulting in creation of one of the "most competitive employee programs ever created by the company (International Business Machines Corporation 2008)."

In early 2009 I was notified I had been accepted to the program as a team member of the IBM Corporate Service Corps Brazil Team 2. After selecting the best period to work internationally for a month for both my professional and personal life I began the necessary training in March 2008. The IBM Corporate Service Corp Brazil Team 2 consisted of IBM employees from 8 different countries from a variety of departments. I met weekly with my international IBM team virtually via conference calls, and we immediately began team building exercises. The training took the form of online course work, and was discussed during the weekly team meeting conference calls. The course work covered topics such as:

- Leadership
- Consulting
- Cultural adaptability
- Risk mitigation and conflict management
- Communication
- Emerging markets

In the three weeks leading up to actually traveling to Brazil I learned of my assignment. I would be working with Estacao Ciencia ("Science Station") with two other IBM employees from Germany and Australia. We were the second IBM team to work with Estacao Ciencia, and had the advantage of building on earlier work done by the previous IBM Corporate Service Corp team. We worked to improve Estacao Ciencia's strategy surrounding their communication, motivation, and leadership organization. Furthermore, we worked to provide recommendations on technical solutions for their web based virtual lab. Working for only one month on such tasks demanded adherence to a defined schedule, scope management, and close collaboration with Estacao Ciencia. Our overall schedule we divided up into four weeks:

- Week 1: Problem definition and understanding
- Week 2: Solution definition
- Week 3: Implementation
- Week 4: Documentation and hand-off

Working with a non-profit was very dynamic. Estacao Ciencia was very willing to learn and implement solutions suggested on a very accelerated timeline when compared to traditional United States based companies. Estacao Ciencia was very interested in how we decided on a particular solution, methods to implement, and resources to measure their success. More importantly, the conversation around any solution always turned to how they could better serve the people visiting Estacao Ciencia. Estacao Ciencia is very committed to looking for new techniques to improve the organization in order to better serve their patrons. Innovative new non-traditional solutions were always welcomed and encouraged.

We worked daily with the employees to hear their suggestions to issues they were facing, and ideas they had to improve Estacao Ciencia. The director made herself very available to discuss questions, and ideas we had. Estacao Ciencia was very excited to have IBM working to improve their business, and was very willing to dedicate any resource available to help create the best solution possible. This enabled rapid problem solving vital to the success of the project given the time constraint. It was challenging and refreshing to be completely responsible for the full service delivery to the customer. In addition, the experience of creating solutions in a dynamic fast-paced environment significantly increased a multitude of my skills such as leadership, communication, collaboration, and problem solving. As Stanly Litow said, it really is a "triple benefit (International Business Machines Corporation 2008)"

As an employee I:

- Learned how to work face to face and remotely with engineers, consultants, and sales people from 8 different countries.
- Gained valuable leadership, communication, collaboration, and dynamic problem solving skills.
- Gained new insights on challenges and needs of an emerging market.

As a company, IBM gained:

- Exposure as an industry leader working to promote the welfare of people worldwide.
- Attraction and retention of talent.
- A more globally experienced employee with more cultural adaptability skills.
- Essential data needed to successfully operate in emerging markets and with non-profits.
- Information of customer's needs and challenges.

As a non-profit, Estacao Ciencia gained (at not monetary cost) :

- Innovative solutions needed to help their organization succeed in serving the community.
- Networking with the corporate sector.
- Improved organizational leadership, communication, and motivations procedures.

IBM'S PARTNERSHIP WITH CITZEN DEVELOPMENT CORPS

IBM also recognized the need to partner with the public sector in order to successfully deploy the program worldwide, and deliver real value to the community. Therefore, IBM partnered with the Citizens Development Corps as the bridge into these

communities. The Citizen Development Corps focus is, "on developing small and medium size businesses, communities, and local institutions in emerging markets (Citizen Development Corporaion 2010)." The Citizen Development Corps provided the vital connection into the community IBM needed in order to effectively deploy the Corporate Service Program worldwide.

The Citizen Development Corps organization gathered non-profits that had a solid foundation recognized by the local community for their humanitarian efforts. The Citizen Development Corps (CDC) organization then gathered each organization's needs, and properly defined the deliverables that would be achievable in a month. The CDC also gathered the IBM employee's resumes and formed the appropriate teams that would be best suited to meet the non-profits goals. In addition, the CDC provided in country logistics. The CDC assisted IBM employees with proper security, and health information before coming into the country. This included obtaining the proper government required documentation before entering a foreign country such as visas, and vaccination records where necessary. While in country the CDC arranged for transportation, meals, and living accommodations for the IBM employees. Furthermore, the CDC would recruit or enlist one of their local employees to provide general information about the country. For example, CDC provided suggestions on important historical landmarks to visit, explanation of local customs, how to properly interact with locals, and any general questions concerning the local environment. In addition, CDC took the responsibility for the safety and well being of each IBM employee. The services provided by CDC were indispensable. CDC not only provided the proper means for IBM to deploy Corporate Service Corps program into the local community, but they also enabled each IBM employee to concentrate on working with the local non-profit while they took care of logistics. Furthermore, the IBM employees' experience in country was also enhanced by

the recommendations made by CDC. IBM's collaboration with the CDC created a Hybrid Value Chain enabling each party to meet its respective goals.

Hybrid Value Chains in Open Source Methodologies

The public sector is increasingly becoming more interested in open source technologies due mainly to their lower cost, and ability to control of the environment. Non-profits looking to reduce operating costs are looking to deploy open source technologies in their core business, and products. Choosing open source solutions such as Linux allows the non-profit to avoid licensing fees. Open Source methodologies naturally fit with non-profits due to the community centric ideals open source methods are built on. Furthermore, open source technologies allow the non-profit more control and customization over their solution. Proprietary product customization is constrained on the current delivered product. Any further customizations or even fixes need to be funneled through the company. The company must then prioritize the fixes and enhancements they should deploy into the next release of their product, and when it should be delivered. In some cases the request of the non-profit do not make it into the subsequent releases. Thus, a non-profit looking to be more agile needs a means to quickly customize and fix its solutions. Open source technologies provide this capability. Advancements in technology paired with open source solutions are allowing non-profits to reduce costs while being more agile in operations and services.

LINUX SOLUTIONS IN THE HYBRID VALUE CHAIN

Linux is one of the many successful open source projects that non-profits are adopting in place of proprietary solutions. Linux in its simplest sense is an open source operating system. Personal computers, servers, and embedded devices are becoming the cornerstone of many organizations. Thus, having a solution such as Linux enables a non-profit low on resources to take advantage of a robust operating system which they can alter to fit the needs of their business.

Corporations are also very interested in deploying open source technologies for some of the same reasons as non-profits. In fact, substantial investments by corporations in advancing Linux in the marketplace and in the community are seen. Moreover, there are many for-profits business that have Linux at the heart of their business. Businesses such as Red Hat, Novell, and Canonical have built their core business on Linux. IBM, HP, and Dell all have Linux options in their product offerings. Non-profits are also being formed around the advancement of Linux. For example, the Linux Foundation's primary goals are to promote, protect, and advance Linux (The Linux Foundation 2010). Although companies such as IBM and Oracle compete in some of the same markets, both see value in advancing Linux, and are thus have board members on the Linux Foundation. In fact, many many large corporations have board members on the Linux Foundation. Companies such as: Qualcomm, Oracle, Fujitsu, Intel, IBM, Hitachi, AMD, NEC, and Motorola all have board members on the Linux Foundaion (The Linux Foundation 2010). With the Linux market estimated to be $50 billion, companies are undoubtedly investing resources to capture as much of this market space as possible (The Linux Foundation 2010).

Open Source technologies such as Linux can act as a integral resource in the Hybrid Value Chain. We have defined the need and opportunity in developing countrires. Linux being valuable to both the profit and non-profit sectors provide a channel for companies to gain access into developing countries. As Linux can be customized to properly fit a variety of needs at a lower cost it becomes very appealing to corporations and citizen-sector organizations collaboratoing on delivering solutions to developing countries. People in developing countries not currently locked into a proprietary solution or acustomed to a particular proprietary solution are more open to Linux-based technologies. Additionally, the lower cost of ownership associated with Linux based

solutions make them more feasable for the people in developing countries. One of the more popular solutions deployed worldwide for the primary benefit of educating children in developing countries is the One Laptop Per Child initiative.

ANALYZING ONE LAPTOP PER CHILD INITIATIVE

Nicholas Negroponte pitched the idea for a small form factor $100 laptop computer designed specifically for the education of children in January 2005 at the World Economic Forum in Davos, Switzerland (One Laptop Per Child 2010). One Laptop Per Child (OLPC) is a non-profit organization working "To create educational opportunities for the world's poorest children by providing each child with a rugged, low-cost, low-power, connected laptop with content and software (One Laptop Per Child 2010)." OLPC recognized the deficiencies in education among the children in developing countries, and set out to develop a small laptop to aid in the education of children in developing countries. The most recent educational device OLPC has shipped worldwide is the XO laptop, which is the sixth iteration of the OLPC design since 2005. Figure 7 is a picture of OLPC's XO laptop and software interface.

Figure 7: OLPC XO Laptop (One Laptop Per Child 2010)

The XO laptop is a unique design leveraging the work of OLPC, and the open source community. In addition, OLPC partners with corporations for its manufacturing, components, and software. OLPC's original design manufacturer is Quanta Computer Inc.; its Sugar operating system is based on Red Hat's Linux, and the processor is supplied by AMD. Since 2007 OLPC has shipped approximately 1.5 million computers worldwide (Wikipedia 2010). We can see a Hybrid Value Chain in action here to supply educational needs to children in developing countries while enabling corporations to improve their shareholder value. Additionally, OLPC itself must partner with citizen-sector organizations to effectively deploy the laptops to children in developing countries worldwide. It is important to note that as in any well functioning alliance the participant ratio does not need to be 1:1 as demonstrated by the design, construction, and deployment of OLPC's XO laptop.

The XO laptop aimed to fill a need that was largely being unmet. Necessity being the mother of invention led to the small form factor laptop. The for-profit technology

industry discovered consumers in developed countries would also be interested in purchasing a very portable small form factor laptop. Thus, we saw the emergence of a netbook computer following many of the form factor designs of the XO laptop. Intel also saw an opportunity to enter into the education market in both developing and developed countries and produced the Classmate, see figure 8. As a result of the OLPC initiative to fill an educational need of a developing countries it created a netbook market, and expended the education market.

Figure 8: Intel's Learning Series Classmate PC (Intel 2010)

EXAMINING AN OLPC DEPLOYMENT IN SAO PAULO, BRAZIL

In June of 2009, I had the opportunity to visit Ernani Silva Bruno School in Sao Paulo Brazil educating children from six to fourteen years of age. The Ernani Silvia School is located in one of the low-income areas of Sao Paulo, and many of the student's families live below the poverty line. The University of Sao Paulo worked to obtain an educational grant for children in local developing areas and utilized the funds to deploy 50 XO laptops to 300 children. Here we see the consumer end of the OLPC Hybrid Value Chain utilizing local Universities familiar with the local community to deploy laptops to the end users. During my afternoon visit to the school I had the opportunity to talk with Jorge Franco, the school's IT facilitator/instructor, and Irene Ficheman, the university's professor who helped deploy the solution.

Speaking with Dr. Irene Ficheman I learned the university evaluated the Classsmate PC and the XO laptop. They decided on the XO laptop due to its software focus on children and education. Dr. Ficheman said the XO laptop allowed the children to participate in dynamic learning where they could connect to the internet to research a subject currently being discussed, collaborate with other students online, read from a vast library, and easily share documents they had created with the professors and other students (Ficheman 2009). When I asked Dr. Ficheman about the importance of technology to eliminate poverty she said, "When people do not have access to technology, poverty increases very fast, and it is hard to overcome this gap as the children become adults (Ficheman 2009)." Dr. Ficheman's assessment of the impact of technology on poverty confirmed the need of services by developing countries in order to help overcome poverty.

During my visit to Ernani Silva Bruno School I also had the opportunity to briefly talk to the school's IT facilitator/instructor, Dr. Jorge Franco, to learn how the XO laptop had impacted his ability to teach the children, and what were some of his observations. When I asked Dr. Franco how he utilized the XO laptop in his curriculum he stated the XO laptop's primary benefit is its size which makes it easy to wheel in a cart of laptops into any room to helping to facilitate reading, writing, typing, researching, and social networking (Franco 2009). Beyond the classroom I wanted to learn how Dr. Franco viewed developed countries bringing technology into developing countries. Dr. Franco replied with a positive perspective stating that delivery of technology creates a foundation from which people in developing countries can create new technology. Without the delivery of technology developing countries would have to create that base (Franco 2009). Dr. Franco added the absence of technology would drastically inhibit the innovation of people in developing countries, and ultimately prolonging the time people

in developing countries stay in poverty (Franco 2009). Dr. Franco expanded on this idea by stating that technology by itself is not sufficient as a teaching tool, or as a means to lift people from poverty (Franco 2009). Dr. Franco said services, demonstrations, and interaction with people familiar with the technology was just as essential as the technology itself (Franco 2009). Dr. Franco closed by stating, "Even small demos to children encourage them to do more, and gives them concrete evidence that using this technology as a tool is very real and possible (Franco 2009)."

My visit to Ernani Silva Bruno School confirmed that technology does enable people of developing countries to overcome poverty. However, the technology by itself is not adequate. Dr. Franco pointed out that services associated with the technology are just as important. Technology provides an advanced starting point from which people of developing countries can start creating. This emphasizes the importance of Hybrid Value Chains in bringing complete solutions to developing countries. Corporations have products that can enable people in developing countries to accelerate their path out of poverty, and citizen-sector organizations provide essential services to help the people interact with the products.

Business Case for Open Source Healthcare Appliance in Developing Countries

Dr. Abraham Maslow's, "A Theory of Human Motivation," defined that human's most basic need to survive must first be met before he/she is motivated to fulfill other needs. It is this primary need that must first be meet before a human being is able to satisfy any other need, see figure 9.

Figure 9: Maslow's Hierarchy of Needs Chart (Abraham Maslow Father of Modern Management 2010)

Thus, a company working to align it's strategic goals with the needs of developing countries must determine that the most basic needs of the people are being met. A company can drastically expand a market once the people of developing countries have the necessary means to survive. Proper health care for people of developing countries is imperative to the fulfillment of this foundational physiological need. A company can work through a Hybrid Value Chain to provide services and products to improve health care for citizens in developing countries while improving shareholder value. Once the basic needs of the people have been met they are in a position to consume other resources the company may offer. Therefore, the company has

essentially expanded the market it serves while adding shareholder value and improving the lives of fellow global citizens.

> "A Healthy society creates expanding demand for business, as more human needs are met and aspirations grow. Any business that pursues its ends at the expense of the society in which it operates will find its success to be illusory and ultimately temporary (Porter and Kramer, Strategy & Society: The Link Between Competitive Advantage and Corporate Social Responsibility 2006)."

The global market for healthcare in developing countries is estimated at $202 billion, and is expected to grow exponentially (Drayton and Budinich 2010). Thus, there is a large economic opportunity to deliver life sustaining services to the people of developing countires. However, lack of medical professionals in conjunciton with remote underdeveloped areas present a challenging factor for delivery of healthcare services and products. Ashoka recognized this opportunity and built a Hybrid Value Chain between Indian businesses and citizen-sector groups. The solution overcame this barrier and delivered a solution called E Health Points.

E Health Points utlize video technology and efficient business practices to treat it's patients in a cost effective manner. The patient and the doctor both use a web camera paried with a display to communicate over an internet connection, see figure 10.

Figure 10: E Health Point Video Conferencing (Global E-Health Point 2010)

The internet badwidth is delivered via wireless broadband. The patient's records are in a digital format permitting remote doctors to quickly analyze. The clinics are able to keep costs low by making use of generic drugs, resourceful local staffing, and advanced point-of-care diagnostics (Drayton and Budinich 2010). Due to the preliminary success of E Health Points the finance minister for Punjab requested 600 E Health Points to be deployed (Drayton and Budinich 2010). E Health Points allow rural citizens of India to access high quiality healthcare services at affordable prices while earning profits. It was only through the collaboration between companies to deliver products and the citizen-sector orgnizations to develop the solution that this project was made possible.

Another example of leveraging existing technology to serve people in developing countries is the use of a computer-assisted diagnostic system in Rwanda. The developing country of Rwanda faces the same infrastructure obstacles inhibitating the traditional delivery of healthcare services many other countries face. As in India, one of the main difficulties is pairing limited medical professionals and services with patients in rural remote areas. In Rwanda there is about one doctor per 25,000 people (Friedman 2009).

Furthermore, the solution needs to be cost effective for low-income citizens, and needs to work into the lives of the local citizens. Dr. Edward A. Friedman of Stevens Institute of Technology recognized the need to serve remote rural Rwandans' most basic healthcare needs. Dr. Friedman utilized the work done by Dr. Abraham George of the George Foundation in computer aided diagnostics systems for his solution in Rwanda. Dr. Abraham's solution was developed for the needs of people in India, and has been deployed for over eight years (Friedman 2009). The computer aided diagnostic system called, Early Detection and Prevention System (EDPS), was designed to work without a network connection, operated by locals with no medial training, and has solved 74% of the cases in India with 94% accuracy (Friedman 2009). The EDPS enabled people without medial training to diagnose patients, "resulting in more people being cared for, prioritizing the most serious cases, getting patients most in need to the doctor quickly, and establishing electronic, portable medial records (Friedman 2009)." Through the use of innovative technologies people of Rwanda now have access to healthcare solutions, and companies partnering with the non-citizen sectors to deploy this solution are gaining an entryway into the healthcare market in Rwanda.

Todays technological advancements provide new methods for engineering managers to be more innovative in their solutions. In addition to new technological advancements, innovative business methods such as micro loans are allowing businesses to be more dynamic in their solutions.

Kivia provides a unique connection between people of developing countries and people of developed countries. Kiva provides a mechanism for people of developed countries to provide loans to people of developing countries. This cements the idea of being a responsible global citizen. Furthermore, the citizen-sector organization provides the means for developed countries to provide resources to developing countries while

ensuring that both parties receive and deliver value. Kiva has provided the means for over $100 million in loans to people in developing countries (Kiva 2010).

Technology is providing the physical means to overcome many of the obstacles developing countries face when trying to deploy health care solutions. Hybrid Value Chains provide a process for a business to put the solution into the people's hands.

Scientists are developing a concept called, "labs-on-a-chip" that aim to significantly reduce the need for experienced professionals and large laboratories to do virus screening. These labs-on-a-chip reduce the foot print of a large labroatory screening devices down to a microchip.

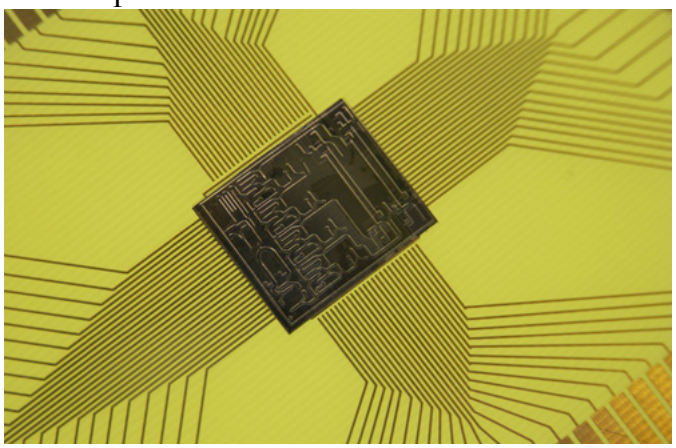

Figure 11: Lab on a Chip (Bartlett 2003)

Researchers at Birgham Young University are producing labs-on-a-chip that are able to "detect specific proteins or viruses from even small samples at low concentrations (Moore 2010)." At the University of Michigan scientists are developing a technology to remove cumbersome pumps from labs-ona-a-chip via the use of music further simplifing which improve the ability for these chips to be deployed as easy health screening devices (Lab Spaces 2009).

Scientist at the University of Texas are working on the autonomous interaction of the checking of a patient's vital information and data transmission to doctors.

Specifically, the scientists are working with implantable devices that automatically measure the patient's vitals and send results to a cell phone via short-range radio chips which then relay the information to a medical professional for evaluation. The medical professional can then send instructions to the device and have it perform predefined tasks such as administering insulin or painkillers (Borel 2009).

Advancements in technology have created ways to help diagnose problems in a cost effective manner. Engineers at Fraunhofer Research Institution for Modular Solid State Technologies (EMFT) in Munich have developed a bandage that easily shows if a wound is infected. EMFT scientists are now looking to collaborate with an industrial parnter in order to bring the product to market (Quick 2010). Australian scientists at Monash University, Melbourne have develped a new process to test blood type for just a few pennies per test, and provides results in four to 10 minutes (Marginson 2010).

A group at the University of Washington has formed a group called "Change" to explore "how technology can improve the lives of underserved populations in low-income regions (University of Washington 2010)." Some of the projects Change has developed are :

- Open Data Kit: A extensible, open-source suite of tools designed to build information services for developing regions (University of Washington 2010).
- CommCare: A tool for community health workers to perform their day-to-day tasks (University of Washington 2010).
- SmartConnect: Hardware device to help health facilities report on the vaccine cold chain to health ministries. (University of Washington 2010).
- Mobile Midwives' Ultrasound: An inexpensive ultrasound designed for midwives in low-income regions (University of Washington 2010).

- MDPhone: A portable medical platform that enables telemedicine and basic medical diagnostic assistance (University of Washington 2010).

These citizen-sector inititatives are conceived at the University of Washington. All of these projects ulitize open source methodologies in either their platform or in their end solution. Additionally, these projects utilize open source ideals and post their project source code and ideas in the public domain encouraging others to build off their source, and suggest ideas and improvments. Open Data Kit (ODK) posts its source code and documentation to code.google.com. ODK encourages others to participate in generating new ideas and improving the project. Furthermore, most of these projects utilize open source platforms, such as Linux and OpenMRS, to deploy their solution. As an example ODK uses Android as a platform from which to build their solution. Android itself is built off Linux. This is where open source technologies excel. The community collaborates to build a platform that can be easy tailored by corporations and citizen-sector organiztions to deploy in their unique solutions. The ability to tailor the platform fosters innovation as the innovator can adjust the platform instead of working around missing features or lack of interfaces.

Although these projects are able to construct prototypes the need to partner with corporations skilled in bringing these technologies to the market. For example, CommCare partners with Dimagi, Inc. in order to take the proff-of-concept and put it into the people's hands. Dimagi, Inc. needs the innovative ideas generated by Change projects, and Change projects need Dimagi's resources to bring the product to the people. This is yet another example of a High Value Chain providing benefits to both parties.

SmartConnect builds off ODK, and aims at providing similar services that E Health Point and Early Detection and Prevention System provide. However, SmartConnect is working to enable individuals with a mobile phone, which is becoming

more prevalent in developing countries. Through software programs and peripherals the user can diagnose their health care needs. SmartConnect's main goal is to provide many of the standard health measurement tools that would be found in a traditional doctor's office such as a heart rate monitor, blood pressure, and stethoscope in a mobile form. A smart phone would be able to download SmartConnect's software, and the user could then connect peripherals to document the patient's vitals. The patient's information is then sent to a medical professional via the cell phone's data connection. The medical professional could then respond and send proper instructions on how to treat the patient.

It is quite conceivable given just some of the existing health care solutions such as E Health Point, Early Detection and Prevention System, and SmartConnect paired with the advancements in technology that a remote health care appliance can provide appropriate healthcare diagnostics. Moreover, with the emergence of the public sector, Hybrid Value Chains are facilitating innovation, and enabling companies to collaborate with citizen-sector organizations to bring healthcare solutions to low-income individuals in developing countries. Such systems could be a central point in communities that are rural and remote to healthcare professionals. Allowing medical professionals to utilize databases such as the one in the Early Detection and Prevention System to see trends, and other diagnoses has immense benefits to the medical providers and patients. It is very plausible that such health care appliances could provide instructions to individuals on a touch screen tablet device via simple pictures and native language instruction with minimal text allowing local residents to operate the device. As SmartConnect suggests, peripherals are also available that would permit a remote healthcare appliance to analyze a range of services such as :

- Photo recognition of patient's urine samples in conjunction with testing paper.

- Photo of patient's physical ailment.
    - Utilizing specialized Ear Canal Picture system
    - Utilizing specialized Mouth Picture system
    - Utilizing specialized Eye Picture System
- Voice recording of patient's ailment.
- Patient's blood sample analysis which could be used in conjunction with lab-on-a-chip, and blood testing such as those used to test insulin levels.
- Patient's heart rate documentation.
- Patient's breath property analysis utilizing technology such as those used in lactose breath tests.
- Patient's weight measurement and analysis.

These healthcare appliances could also utilize advancements in Radio-Frequency Identification (RFID) to interface with patients by the use of cards or bracelets to securely log users in without adding too much complexity. RFID bracelets or cards could also ensure that patients receive the correct medications. Furthermore, RFID would help alleviate the user from tracking their health records. Healthcare appliances being connected to wireless broadband would not store medical records locally, but would sync at secure hubs. As in any system a use of a building, training, and supply chain would be necessary for the community and medical professionals. In addition, the entire solution could be built on open source standards to encourage collaboration, customization, and lower cost. The goal of the these healthcare appliances is to make the diagnosis and treatment for both the medial professional and patient as easy as possible regardless of the distance between the two. Hybrid Value Chains would be imperative to the successful deployment and attraction of companies. Such appliances could provide an entryway for companies into the $202 billion dollar developing country healthcare market, while

improving the life of global citizens. The analytics and infrastructure surrounding such solutions provide additional opportunities for interested companies. Plus, as people in developing countries receive the necessary healthcare they are better equipped to pursue other services and products.

Conclusion

> "Concern for man and his fate must always form the chief interest of all technical endeavors … Never forget this in the midst of your diagrams and equations." –Albert Einstein

It is an exciting and challenging time for engineering managers. The engineering manager who is able to meet the needs of the developing world will be the market leader, and the manager who cannot will consign his/her company to failure. Moreover, delivering solutions to the developing world not only is essential for a company's continued success, but it is an inherent responsibility each engineering manager should be conscious of if he/she continues to operate the business in a global context. With the emergence of citizen-sector organizations and technology many of the barriers once prohibiting the deployment of sustainable solutions in developing countries are beginning to fall. Pioneers in this area such as IBM, Harvard's John F. Kennedy School, the Clinton Global Initiative, and Ashoka are already gaining valuable insights, and the continued acceptance of open source methodologies is encouraging and enabling innovation. Thus, an engineering manager has many resources to help align their company's strategy with the needs of the developing world. At the end of the day, it is our human obligation to treat our neighbors in the same way we would treat ourselves. Doing so does not mean we must nullify our responsibility to shareholders. It means we have the opportunity to innovate in an exciting way not possible before. Engineering managers are now equipped with resources to improve the standard of living of all humanity globally.

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Vita

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